

ST. JOHN

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An Introductory Address... 1857

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AN
INTRODUCTORY ADDRESS,
DELIVERED AT THE
OPENING
OF THE
ANNUAL COURSE OF LECTURES
OF THE
COLLEGE OF PHYSICIANS AND SURGEONS,
IN THE CITY OF NEW YORK,
OCTOBER 19th, 1857.
BY
SAMUEL ST. JOHN, M. D.
Professor of Chemistry.

NEW YORK :
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At a meeting of the Class of 1857 and 1858, of the College of Physicians and Surgeons, held October 21st, on motion of Mr. R. H. Hinman, Mr. C. P. Russel was appointed Chairman and Mr. R. F. Weir Secretary of the meeting. The following resolutions were then adopted:

1st. To appoint a Committee to confer with Professor Samuel St. John, and to solicit for publication the manuscript of his Introductory Address, delivered October 19th.

2d. That Messrs. E. P. Whitney, C. Phelps and J. H. Thompson be that Committee.

Agreeably to the above resolutions, the following correspondence was entered into:

PROF. SAMUEL ST. JOHN:

Sir :—As representatives of the Class of 1857–8 of the College of Physicians and Surgeons, we have been delegated to request from you, for publication, a copy of the Introductory Address pronounced before us on the evening of the 19th inst. Should the request be honored by your approval, we shall take great pleasure in communicating the result.

CH. PHELPS,
EDWARD P. WHITNEY,
J. HARRY THOMPSON.

OCTOBER 26th, 1857.

MESSRS. CH. PHELPS, EDWARD P. WHITNEY, J. HARRY THOMPSON:

Gentlemen :—I accede to the request of the Class, expressed through their Committee, for the publication of the Address, with the hope that it may serve to illustrate, in some humble measure, the fitness and importance of mental discipline in the student's preparation for the responsibilities of professional life.

SAMUEL ST. JOHN.

A D D R E S S.

MR. PRESIDENT AND GENTLEMEN:

ON an occasion like the present, I might be expected to commend to your favorable regard that branch of Science with whose supervision and administration, in this Institution, I am honored.

If this branch of Education were new, or if the general sentiment of the profession and of mankind had not been decidedly expressed in its favor, I should feel it incumbent upon me to attempt a plea in its defense. But, since it is neither novel nor destitute of public favor, I have deemed it not inappropriate to ask your attention to the general philosophy of the processes of Education—a topic of vital interest to the well-being of society, and which has elicited the widest discussion, not only with the view of improving details, but of placing the whole system upon a rational foundation, in accordance with the spirit of the age, and the constitution of the human mind.

I propose, briefly, to consider the peculiar claims which Natural Science has to be considered a branch of liberal Education, and the important purposes it may subserve in training the mind for efficient action.

It may be viewed: I. In reference to the immediate discipline of the powers of the mind. II. With reference to certain intellectual habits which the study is fitted to form and strengthen; and, III. In its manifold relations with the useful arts and the economy of life.

I. The physical sciences are not only pleasing subjects of

contemplation to the mind, but they conduce to its thorough discipline and fit it for successful action. The most obvious thought, suggested by reflection upon the intellectual relation which man sustains to the material universe, is, that he commences his existence entirely destitute of knowledge, but endowed with a mental appetite, and surrounded by objects fitted to stimulate and gratify inquiry. The object of Education is, to render the mind an efficient instrument for the discovery and application of the laws to which the Creator has subjected the universe. That it is practicable to train the mind to greater skill in the discovery and application of these laws, appears from the fact that the human mind is so constituted that certain processes of thought are better adapted to the discovery of truth than others, and that the reasoning powers are rendered more efficient by exercise. Just in proportion as the student acquires skill in the use of his reason, is his progress in knowledge. It is not merely the knowledge which physical science conveys, and the value and extent of its applications, but from the nature of its methods and reasonings, from the power and energy of the agents employed, and from the striking character of the phenomena, all eminently calculated to awaken curiosity and fix the attention, the mind of the student, instead of being forced to a compulsory exercise, is led, by the interest it feels in the subject, to exert itself in a way eminently calculated to invigorate its powers of attention, observation and reasoning. Every one, who is at all practically acquainted with the business of education, is well aware of the difficulty of fixing the attention of the student. The vivacity of the youthful mind, arising from the acuteness of its sensations, continually attracts it to external objects. Now, in the study of natural science, the senses are made purveyors to the mind, and facts and principles, deduced, as it were, by its own observation, give the greatest accuracy and precision to the ideas thus acquired. Natural history has been termed a science of observation, and such, in a restricted

sense, it undoubtedly is—as a definition, however, it is partial and insufficient. Should the naturalist confine his attention to the external forms of objects, to the compilation of a dictionary of their names, together with the uses to which they might be applied, he would manifestly overlook the essential philosophy, the splendid truths which give dignity to the science. All branches of science, however varied may be their materials, or diversified their nature, have but one object in view—the discovery of the primary laws of nature. By a series of legitimate deductions and generalizations, the science, which, in the early state of development, was one of observation, becomes one of demonstration, and as such claims kindred influence with the mathematics in developing and disciplining the reasoning powers. The remarks of Baron Cuvier, on the influence of this class of study in forming habits of mental discipline, are striking and pertinent. “The habit naturally acquired,” says that great man, “in the study of natural history, in the mental classification of a great number of ideas, is one of the advantages of the science that has seldom been observed, and which, when it shall have been generally introduced into the system of education, cannot fail to be appreciated. By it the student is exercised in that part of logic which is termed method, just as he is by geometry in that of syllogism. Now, this art of method, once well acquired, may be applied with infinite advantage to studies the most foreign to natural history. Every discussion which supposes a classification of facts, every research which demands a distribution of topics, is performed according to the same laws.” A notable instance, in which the fitness of these studies for awakening the dormant faculties and developing a disciplined and well furnished mind, has within a few years engaged public attention, in the case of Mr. J. P. Norton, late Professor of Agricultural Chemistry in Yale College. “We were much interested,” says a writer of a biographical sketch in the New Englander, “in the account of his first scien-

tific study, which we received from Theodore Dwight, Esq., who had the direction of his studies the first winter he was sent from home. Mr. Dwight says, ‘In my first interview with him, I found he had a decided aversion to every branch of study, especially Latin and Greek. I sought for some pursuit in which he might feel some interest, but went through the whole range of sciences and literature without success, when at last I mentioned mineralogy. There I found him alive and willing to answer questions, and I soon learned that for two years or more he had appropriated his money to the purchase of minerals, and had a large collection. I inquired anxiously how he had arranged them, and he replied that he had made three attempts to arrange them according to their colors and names, and found that they could not be classified at all. I assured him of the contrary, and told him that the proper principle was that of their composition. He immediately inquired how any one could know what stones were made of. I explained, in a simple manner, analysis and synthesis, and promised him that he should begin the next day to decompose minerals, and (what pleased him more, although he did not half believe it possible) compound and form some for himself. Henceforth there was no want of interest in his studies, and from the hour of this conversation he became one of the most hard-working scholars of his time.’ Professor Andrews adds, (*Ohio Journal of Education*, vol. II., p. 12): ‘His previous studies of grammar and arithmetic, Latin and Greek, had all been to no purpose, because the vibrating chord of his intellect had not been touched. This once touched, and there were sympathetic vibrations through his whole soul. From his mineralogy he passed on from one science to another, and from the acquisition of one language to another, until his attainments were most enviable, and at the early age of twenty-four he was chosen Professor of Agricultural Chemistry in Yale College. Although his career was very brief, he was doubtless the ablest teacher in that

department in our country, and made his influence felt throughout the land, by awakening an unceasing interest in scientific agriculture.' " It should ever be remembered, that the senses are the immediate purveyors of the mental powers. As the Creator has formed the universe partly for the education of the human soul, He has completed his plan by giving to the soul the senses, to act as its instruments in receiving education. Accordingly, the various sciences which are used for developing the intellectual powers are based upon the intercourse which the mind, through the senses, holds with the material universe. Now, the only way in which these sciences can be well understood, is by mingling, with the study of books, a sufficient leaven of original observation and experience to imbue the whole with life. The studies of our school-boy days are to a great extent abstractions, employing in a slight degree the evidences of the senses, while the natural sciences, by training the mind to habits of watchfulness and attention, tend to impart that power of discrimination which constitutes, in no small degree, mental superiority. We know that accuracy and activity in business, that skill in every art, that the correctness and life of most literary and scientific description and illustration, depend upon the training of the senses; and that throughout the student's whole life, whether it be when, as a lively child, he is attentive only to feeling and the works of nature, or when he has become an adult, and minglest reflection with observation, or when the man has lost the acuteness and strength of his bodily organs in the infirmities of age, and lives only in memory and meditation, the character and condition of his mind are most decisively influenced by the intercourse he has held, through the medium of his senses, with external nature. Do we, then, exaggerate the importance of those sciences, as branches of education, which strengthen and sharpen the senses, and thus give vigor and keenness to the mind, enlarging the sphere of its usefulness and enjoyment?

II. I proceed to consider the relation of this study to certain intellectual habits, which it is fitted to form and strengthen, without which little can be expected from the richest native gifts of mind. There is a philosophic spirit or habitude of mind which is far more valuable than any limited acquirements of knowledge. The acquirements will fade from the memory, unless their impression be frequently renewed, but the disposition or character of mind to which they give birth will be enduring. As in chemistry two substances combine and produce a new body, different from each of the constituents, so our aptitude for the attainment, appreciation and enjoyment of knowledge combines with the human soul, constituting a portion of its spiritual power, and is as imperishable as the mind itself.

1. This study tends to establish the habit of patient thought, of fixing the attention upon any subject of investigation, and of retaining it in mind till all its various bearings and relations have been fully examined—of holding it in the focal point of illumination till it glows and burns. This constitutes the genius of investigation and reasoning on all subjects. Nor is there, probably, any habit of mind more prolific in discovery and invention—more truly characteristic of a great and powerful mind.

2. A second habit of mind, necessarily induced by this study, and allied to the former, is that of accurate and persevering observation; a quick discernment, accustomed by practice to distinguish differences which an ordinary observer would overlook. The importance of this habit and of its early formation is apparent, from the fact that the want of it proves fatal to all high attainments. As no pursuit requires more observation or greater nicety of discrimination than that of Natural Science, it is pre-eminently fitted to qualify the mind for the application of the acuteness and judgment, thus acquired, to the pursuits of subsequent life, which may call for the exercise of sound reason and just discrimination. The student, who has been taught to receive as true only what is

the result of observation or experiment, will be in little danger of being led away by the insidious arts of sophistry, or of having his mind bewildered by fanaticism or superstition. The knowledge of *facts* is what he is taught to esteem ; and no reasoning, however specious, will induce him to receive as true what appears incongruous, or can not be enforced by demonstration.

3. Another habit of mind, naturally consequent upon this pursuit, is that of *enthusiasm*, the foundation of an ardent, inquiring mind. There is an inexpressible satisfaction, an intellectual delight, in the pursuit of truth, which few but the philosopher can understand. This luxury of the soul, as it has been well termed, belongs especially to the pursuit of Natural Science. He who studies the forms of Nature has before him models of perfection. He has not to consult popular taste or arbitrary opinion as to the value or importance of his pursuits. He has before him truth : his sole business is to analyze and classify all the parts and relations of that truth. If, indeed, all truth be not attained, yet, with superior minds, the very difficulty of attainment serves but to increase the ardor of its pursuit. Whoever enters upon this study with proper views, and pursues it with intelligence and success, rarely looks back, but is continually urged on by the discovery of new and wonderful truths which fill his mind with ennobling emotions. Nature has her history written on her very lineaments ; a history so interesting that the most splendid fictions of human imagination sink into insignificance when compared with it, as human productions must when compared with the works of the Creator. The study of Nature leads its real votaries, by the pleasure derived from the observation of her ordinary phenomena, to the deeper delight afforded by the contemplation of the unity of design and the harmony of all her relations. Then it is that new susceptibilities to some of the purest and most exquisite mental pleasures awaken in the breast, and we become conscious of sentiments and powers before dormant and unknown. A wide survey

of the operations of Nature, in their sublimities and beauties, furnishes such a conception of the wisdom displayed in their origin and maintenance as compels our admiration. The demonstrations of power, evinced by the desolating tornado and terrific earthquake, strike us with awe, but are scarcely more convincing than the skill and wisdom manifested in the silent combination of the gases, in the exquisitely graceful figures of crystals, and the perfection of organization discernible in some of the minutest forms of vegetable and animal life. Chemistry teaches us that the oxygen which kindles ordinary combustion is the same principle which purifies our blood, evolving animal heat, and sustaining the steady flame of life; while the same particles of carbon are found successively in the mineral, vegetable and animal kingdoms, coursing a ceaseless round, illustrative of Nature's method of maintaining stability by incessant change. If we minutely examine a drop of water by the aid of the microscope, we find it crowded with myriads of animalculæ, deriving sustenance and finding ample scope amid its uncounted particles; and if we proceed to analyze it by superior attraction, we find that in the mild bosom of its compound state there are locked up two of the most energetic elements known—oxygen, the supporter of combustion, and hydrogen, the most combustible of all substances. To the eye of cultivated intellect, every part of creation, beams with rays of light, and glory, and beauty. The enthusiastic zeal of every true student of science testifies that his pursuits are of the highest interest, and is a sure promise to the beginner, who sees but dimly into the system of Nature, that knowledge will, in itself, be a sufficient reward. For the highest success in the pursuit of any object, there must be a sincere love of the object itself. The student, the thinker, the author, who is true to his vocation, loves the truth which he seeks to develop, embody and enunciate. He labors not for mere subsistence nor for fame primarily. These may, indeed, result from his labors, and he may

welcome them, but truth is higher and dearer in his estimation than they. Newton, sitting half a day on his bedside, with his fast unbroken, rapt in a problem of fluxions; Bacon, taking his death-chill in an experiment to test the preserving qualities of snow; Linnaeus, studying the Flora of the Arctic Circle in place; Cuvier, a lordlier Adam than he of Eden, naming the whole animal kingdom in his museum, and reading the very thought of the Creator after him, in their wondrous mechanism; Pelletier, laying down his life in an attempt to demonstrate the fitness of Chlorine for respiration; Franklin and Davy, wresting the secrets of Nature from their inmost hiding-places; these, and hundreds of others similar, attest the power of these studies to elicit enthusiasm, and engage the hand and heart in the service of Truth—
he Truth as she appears in the works of God, as seen in her sublimities or her beauties, in her world-poising might, as she moves among the spheres, in the mysterious laws that combine a universe, and spell it to harmony; or in her seeming trivialities, as she condenses the damps of the summer evening in glittering dew-drops, or paints with tints of lustrous beauty the tiny insect that floats in the sunbeam. Truth is, indeed, the one legitimate object of all intellectual effort; to discover and apprehend, to establish, present and commend it, are the processes and end of study. To discern the things that really are, to distinguish reality from appearance and illusion, is the business of educated mind. It is one of the most interesting facts in the history of science, that almost every great and central truth which we now possess has been secured by the enthusiasm of some gifted man, upon whom its discovery has conferred immortality. To discover it, years have been consumed in the study and laboratory, until the single truth shone forth with established lustre. Galileo spent his life in vindicating the Copernican system, and perfecting the telescope; Harvey, in defending the circulation of the blood; Jenner, in the defense of the theory of vaccination; Lavoisier, in

establishing the correct view of combustion. A burning love of the truth, for the truth's own sake, inspired them, and such an enthusiasm it is one of the benign effects of the pursuit of science to awaken in noble minds.

III. The third branch of the topic named was, the numerous and varied relations which this study bears to the economic arts and the welfare of mankind.

It has been said, with classic beauty and truth, that every vista in the ample domain of science should lead to a temple dedicated to the benefit of man.

Devotion to works of practical utility seems to have been a striking feature of the Saxon race ever since their character was distinctly developed by the progress of civilization. The Germans have been chiefly remarkable for patient study, profound research, abstruse speculation, and critical analysis, in all subjects which can afford material, slight or solid, for intellect to work upon; the French have addicted themselves very much to the pursuit of the agreeable, the beautiful, the exhilarating in manners, literature and life; while the English have been distinguished rather for sober and laborious attention to whatever is substantially useful to man, as a physical, intellectual and social being. They have not, indeed, neglected the elegances of literature, nor the pursuit of pure science; but they have left upon them the strong impress of a passion for utility. And for the Anglo-Saxons in America we may, perhaps, without vanity, challenge the honor of having improved somewhat on the parent English utilitarian stock, the very circumstances of our origin and history as a people having tended strongly to develop this characteristic.

The difference, between man in a state of nature and in a state of advanced science, is almost as great as that between distinct orders of beings. With the former, the visible world is filled with prodigies, and the invisible with imaginary beings. Objects and events, which, familiar to us from our childhood, create no

apprehension, fill his mind with dread and amazement. Every event becomes a mystery to him whose cause he knows not, and whose tendency he has no means of anticipating. Diseases attack him, from causes which he does not understand, and carry their fearful desolations through his frame in a manner which he can neither trace nor control. The thunder rolls and the lightning rives the sturdy oak by an invisible influence which he cannot explain. An earthquake or volcano is equally an object of dread, whose origin is inscrutable. To his view, the stars of night shine with unmeaning splendor or merely excite inquiry whether they exert an occult influence over the fates of men. But when science has shed its light upon his mind, each one of the objects which once affrighted him takes its place among the things known to be adapted to promote his welfare, and to furnish him security and happiness. Nature, no longer full of gloom and terror, has turned her fiends to friends. The restless spirits of superstition are discerned to be the vapors of a mind oppressed by its own imaginings. Relieved of this incubus, man begins to examine the changes in the world around him—which he attributes to some secret and malign influence of invisible beings—traces them to their true causes, and makes them tributary to his comfort and intellectual advancement. The once much dreaded eclipse is now accurately predicted, and intently watched to determine great problems of astronomy and navigation. The elements he subjects to his control; and on every hand innumerable agents rise up, with greater precision and power than those of living beings, to aid him in the accomplishment of his purposes. Disease and danger he learns, by the aid of science, to evade or control, while he scrutinizes the heavens and the earth, the mineral, vegetable, and animal kingdoms, to make all tributary to the expansion of his mental powers, and to the advancement of his social welfare. This difference, between man in a state of barbarism and man aided by the powers which modern science has placed at his dis-

posal, *we* are prone to forget, for at our birth we have been introduced into all the benefits which have resulted from the scientific discoveries of past times. We have not been witnesses of the slow growth of science, of the struggles and conflicts which each of its principles has encountered, before it has been enabled to acquire the ascendancy, and exert its appropriate influence on the welfare of society.

The contrast presented by ancient and modern philosophy, in their direct influence upon the physical welfare of mankind, is most striking; and to the modern views of the *object* of science, as well as the modes of pursuing it, we owe nearly all its rapid advancement. The differences of physical and medical science in ancient times and at the present day are traceable almost exclusively to this. Until the time of Lord Bacon, the true object of science seems not to have been recognized, and the fundamental tenet of his inductive philosophy was hailed as an innovation upon the lethargic systems of ancient philosophy. While the ancient philosophers busied themselves with discussions respecting profound, mystic, ideal schemes, and endless abstract theories of perfection, disdaining all contemplation of processes of nature or art which might be made to minister to the physical benefit and comfort of mankind, Bacon affirmed the true object of science to be, the advancement of the welfare of man, the mitigation of the annoyances of human life, and the accumulation of scientific discoveries and achievements for enriching the human race. Utility, which was ignored or scorned, as degrading ancient philosophy, became the dominant purpose of modern science, and has ever since proved the mainspring of its progress. Nor can we attribute its rapid advancement to the superior endowments of its cultivators. The ancient philosophers have left abundant proofs of intellectual powers adequate to the successful investigation of the laws of nature—admirable specimens of logical and rhetorical skill—but, amid all the treasures of classic lore, we seek

in vain for any rational explanation of the phenomena of nature, with a view to the physical welfare of mankind. In the healing art, what was more obvious than the study of the human frame by dissection, educating the laws of its normal structure, constituting the sciences of anatomy and physiology? Yet, so far as we can learn, dissection was not practiced by the ancients. What system of investigation was more promising than that which accumulates and collates facts respecting diseases, arranges them by patient induction, discovers their laws and furnishes the basis for attempts to restore to a state of health? Instead of this, ancient medicine consisted in attempts to ward off disease, and, failing in this, its efforts to cure the sick were rare and impotent. Another difference between ancient and modern science is conspicuous in their relations to the mass of the people. The former was confined to certain privileged classes, constituting a philosophical caste, wholly isolated from the interests and sympathies of the community, and the knowledge of scientific truths was perpetually liable to perish with their discoverers. But the scientific discoverers of the present day find ready access to the public mind; incorporating themselves in its thoughts and feelings, and modifying its acts, they can never be obliterated. It is related of Phidias, the famous Grecian sculptor, that in carving the statue of Minerva, the tutelar divinity of Athens, he so engraved his own image upon her shield that it could never be effaced without destroying the shield and essentially marring the statue. In like manner the principles of modern science are deeply graven upon the features of society, and so pervade its texture that they can never be removed without its destruction. How can the knowledge of Sir Humphry Davy's safety-lamp ever perish? Not only does it daily guide ten thousand miners in safety amid the explosive fire-damps of the mines, but, as a guardian angel, warns them of their approach to danger. How can the knowledge of the mariner's compass be blotted from the memory of man? Every hour it

guides the vessels of all nations with unerring certainty. When can the knowledge of the use of steam be forgotten? Every ocean, lake, and river, every art and nation acknowledge its power, and the plans of all civilized nations, whether for war or peace, for commerce or manufactures, for ambition or pleasure, involve its use. When shall the knowledge of that property of electricity become obsolete, which as the swift messenger, in the electro-magnetic telegraph, proclaims its utility by annihilating space and time?

The science of chemistry affords as striking illustrations as any which can be adduced of the value of a proper aim and correct method of investigation. It was formerly an occult art, full of mysterious and anomalous processes, based upon absurd theories, and seeking to accomplish contradictory results. Instead of a tissue of absurdities, incapable of reduction to any rational principles, it is now, in the highest sense, a science. Its laws have been examined and ascertained with great accuracy, and are susceptible of demonstration with as much clearness and facility as the laws of mechanical philosophy. So eminently practical has it become, that its beneficial effects are realized in almost every department of life. By its aid, medicinal compounds have been purified and concentrated, until no excuse remains for the incompatible nostrums with which the apothecary's art formerly abounded. By analysis it reveals the dangerous nature of the choke-damp of wells, mines and illy-ventilated apartments, while its safety-lamps have arrested the fearful waste of human life, formerly involved in the extraction of coal. It lights up our dwellings with brilliant gas, reduces the ores of valuable metals, bleaches or imparts the never-fading tint, and, with the aid of the subtle sunbeam, perpetuates the most fleeting forms. It discloses the nature of air, earth, fire and water—of the products of vegetable and animal life. It has not, indeed, yet discovered that *ignis fatuus* of the alchemists, the philosopher's stone, which was to

transmute all substances into gold, but it has accomplished for us far more valuable results, in improving art, in the departments of medicine, agriculture and manufactures, and in disciplining our mental powers, by the study of its phenomena and laws. The secret science (as it was called) has escaped from the mysterious closets of the monks, and become an habitual accompaniment of every department of life, revealing its presence in the atmosphere we breathe, and in all the processes of domestic economy. Less than a century ago, the composition of the atmosphere and ocean were unknown to philosophy; the identity of electricity with lightning was scarcely established; the wonders of galvanism and electro-magnetism were not conceived, and that the same agent is the basis of chemical action was not conjectured. It is unnecessary to trace in detail the causes which led to these changes in the object and pursuit of the science. The principle of that philosophy, which aspires to render science useful to man, runs through them all, and no sooner had chemistry renounced the vain and chimerical dreams of alchemy, than, fearless of the public gaze, she abandoned her hiding-places and stood forth in the broad light of science.

GENTLEMEN OF THE MEDICAL CLASS:

In performing the pleasing duty assigned me, of welcoming you to this Institution at the commencement of its annual course of instruction, it seemed to me that no more appropriate theme for reflection could be suggested, than that which would fix your attention on the course of training to which you purpose to subject yourselves, and which is to be the great work of your lives. You resort to this Institution for what purpose? To prepare yourselves, you will, perhaps, reply, to become physicians. But has it occurred to you to inquire into the fitness or design of your exercises here? Have you become personally convinced that the

great principles of medical education are the true ones?—that they are true because they are founded in the intellectual nature of man? Do you, in your daily mental exercises, reflect that by these processes eminent success is attained, and human knowledge and happiness advanced. The design of these exercises is, whether you are aware of it or not, to render your minds fitter instruments for discovering and applying the laws of the Creator. This design is accomplished whenever the original powers of the mind are thoroughly cultivated by use. But the improvement of the memory, which to some of you, perhaps, seems the whole object of education, does not of necessity strengthen the power of discrimination or induction. The law on this subject is universal, that every separate faculty is strengthened and rendered more perfect exactly in proportion as *it* is subjected to habitual and active exercise. The sciences which you here pursue are of peculiar utility in this point of view, from the very manner in which they must be investigated. They can be pursued with success only by patient examination of facts; their object is unalterable truth, to be derived from oft-repeated observations, and accurate deductions, imparting to the mind a habit of observation, most difficult to acquire, but of inestimable value. Valuable as the information may be, with which you may store your minds whilst pursuing your studies, it is as nothing when compared with the invigoration of the powers of your understanding, and their increased aptitude for application, which will be the certain results of an assiduous and enlightened training of those powers. Your mental habits are of more importance than your acquisitions. The importance of mental discipline, in connection with professional reputation and success, has been too little regarded; and especially in this advanced period of the history of professional science is it a great error in any young man to suppose that he can rise above mediocrity without a thorough cultivation of his intellectual powers. The general principles of the profession—

results as they are of the study, experience and wisdom of successive generations—are, to a great extent, settled upon so firm a basis that they are in very little danger of being overthrown, by dreamy speculations or visionary theories. Medical philosophy is a *science* in the strictest sense of that term—classified facts; the result of the most rigid induction of facts gathered by the most careful experiment and accurate observation. Its practice involves processes of the most severe logic. Too long, for the interests of humanity, has it been believed, that, while thorough intellectual culture and mental discipline were indispensable to success in other professions, the issues of life and death might daily hang upon the inconclusive reasoning of an untutored mind, which has spent a few months in undirected medical reading. But, it may be asked, if an accurate memory and diligent reading have furnished that mind with the requisite facts, is it not fitted for action? By no means. Of what service would the best furnished armory be to him who knows not how to use a single piece? A mind filled to repletion with facts, without that skill in the use of them which is the result of mental discipline, is deplorably imbecile in all its efforts—an elaborate piece of machinery with no moving power. Every year is adding to the amount of learning connected with the profession. It is idle to pretend that there are not, at this day, valuable sources of information, to the examination of which the most industrious life is hardly equal, and without an acquaintance with which no one of the profession ought to hope to secure the confidence and command the respect of his fellow-men. A knowledge of diseases and their remedies, or an acquaintance with the writings of those who have been distinguished in the various departments of the profession, never has been, and never will be, attained by intuition. Nor can it be the work of a day or a year—it is the labor of a life. The last half century has produced a great change in the medical profession. It has opened new sources of instruction of the most valuable character,

and elevated Medical Science to a high and dignified position. To the credit of the age, it may be said that more liberal views are entertained, in regard to medical education and thorough qualification for professional respectability and usefulness, than were formerly cherished. It is now a common sentiment, that while great pains are taken to secure the services of men of talents and learning in the pulpit, and those of the most skill in the legal profession, it is unwise to entrust life and health to the guardianship of ignorant pretenders. With any other views than those which embrace the increasing responsibilities of stations you contemplate occupying, you will degenerate into listless students, and mere practitioners of habit and empiricism. As you value your own success, and the lives and happiness of those who may be committed to your care, permit no opportunity to escape of thoroughly disciplining your mental powers and securing all the knowledge that is attainable by energetic and diligent study. Be assured that the pleasure you will derive from the daily conviction that you are acting on the sure basis of conscious strength and information, will be a source of perpetual enjoyment. Neither should you be content with garnering up the results of previous labors in the cause of Science, but strive to bear at least some humble part in enlarging that intellectual treasury whose magnificence and wealth are freely opened to you. I have called your attention to the fact that the Science of the present generation is the accumulated fruit of the patient study of thousands of minds all guided to one end—the improvement of the human race. From the period when the alchemist brooded over his mystic rites, in indefatigable but vain search after the brilliant phantoms of his dreams, to that in which Davy and Dalton have demonstrated not merely the quality but the definite proportions of the elements of the most complex substances, the long interval has been filled up, and the wonderful conclusions of science attained by the incessant mental toil of numerous, acute, patient,

and daring intellects through days of thought and nights of watching. Great men, during a long train of ages, have accumulated and transmitted to you this more than regal heritage, through a line far more illustrious than any ancestry ever blazoned by heraldry. Instead of inflating your vanity, let this consideration incite you to high resolve and manly action. If you find yourselves to be debtors to the past in an almost incalculable amount, will you not feel stimulated to the desire of paying some part of the debt, by services to the present and the future? Others have lived and toiled for us—it is for us to live and labor for others. Do you say that you lack genius for such exploits? Yet these achievements were wrought by minds like your own. In those periods in which science has advanced with the greatest rapidity, the same discovery has been made independently by several individuals at the same time. This teaches us that the laws then discovered pointed out the next step in discovery, and thus that talent common to many was able to accomplish what the highest endowments in intellect had previously found to be impossible. Men often possess a greater share of genius than they are willing to give themselves credit for. Newton, the prince of philosophers, owed his success, at least, in his own estimation, to his untiring perseverance, rather than to any superiority of natural gifts. Nor should the want of time be objected, when it is remembered that many have acquired an honorable distinction as men of science, with whom philosophy has been only the recreation of their leisure hours. The pressing cares of a diplomatist, and the consciousness that a nation's destiny was hanging, in an important sense, upon the fidelity with which he served its interests, could not prevent Benjamin Franklin from turning aside often to converse with Nature. That well-earned wreath which he will ever continue to wear while experimental philosophy has its votaries, or respect is paid to science, may be said literally to have been woven of those remnants and shreds of time which

by many are given to listless vacuity, to some trivial amusement, or to the cravings of a vitiated appetite. There is no doubt that those splendid attainments in astronomical science which made our countryman, Dr. Bowditch, a denizen of both hemispheres, which gave American science a name and place in European estimation, and which caused his death to be so deeply deplored throughout the scientific world, were owing to his untiring industry and rigid economy of time. Instances of a similar nature might be adduced from almost every walk of science.

The profession, gentlemen, to which you aspire is worthy of your respect, because of its usefulness; of your love, because of its intimate alliance with the virtues which follow in the train of benevolence; of your veneration, because it reckons among its ornaments many of the most powerful minds, whose existence is graven on the records of history, and because of the vast amount of profound truth and sublime speculation which distinguish it as a science, and signalize its achievements as an art. If, with such a view of the calling, you labor with assiduity to fit yourselves for its responsibilities, you cannot fail of your reward. Whether wealth or poverty be your lot, whether you pass your lives surrounded by a throng of admirers, or in the solitude of neglect, whether you are loaded with distinction, or live obscurely useful, you will enjoy the ineffable satisfaction of the assurance that "the blessing of him that was ready to perish has come upon you."

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